

CLAIMS

What is claimed is:

1. A method comprising:
receiving a request, from an application at an application programming interface (API), to interact with a plurality of media; and
generating a media timeline based on the request that:
is for exposure via the API to the application;
includes a plurality of nodes; and
defines a presentation of a first said media referenced by a first said node with respect to a second said media referenced by a second said node.
2. A method as described in claim 1, wherein one or more said nodes are configured as a sequence node such that one said node that is a child of the sequence node is rendered after another said node that is also a child of the sequence node.
3. A method as described in claim 1, wherein one or more said nodes are configured as a parallel node such that one said node that is a child of the parallel node is rendered concurrently with another said node that is also a child of the parallel node.
4. A method as described in claim 1, wherein one or more said nodes is configured as a root node that specifies a starting point for rendering the media timeline.
5. A method as described in claim 1, wherein the first and second said nodes

reference the respective first and second said media utilizing respective first and second pointers.

6. A method as described in claim 1, wherein at least one said node includes metadata that describes rendering of the at least one said node.

7. A method as described in claim 6, wherein the metadata is selected from the group consisting of:

- a URL property for the media referenced by the at least one said node;
- a source object property that specifies a source object which can resolve to a media source that provides the media referenced by the at least one said node;
- a source object ID property that specifies a unique identifier of the source object;
- a start time property that specifies when rendering of the at least one said node is to begin with respect to another said node;
- a stop time property that specifies when rendering of the at least one said node is to stop with respect to another said node;
- a media start property that specifies a time, during a duration of the media referenced by the at least one said node, that rendering of the media is to be started;
- a media stop property that specifies a time, during a duration of the media referenced by the at least one said node, that rendering of the media is to be stopped;
- a time format property that specifies a time format for at least one of the start time property, the stop time property, the media start property, and the media stop property;
- a stream selection property which specifies one of a plurality of streams for

rendering of the media referenced by the at least one said node;

a format based property that specifies a format for the media referenced by the at least one said node;

a loop count property that specifies a number of times the at least one said node is to be rendered;

a disabled property that specifies whether the at least one said node is to be rendered when the media timeline is rendered;

a generic property that serves as a repository of information related to the at least one said node, wherein the generic property is configured for specification by at least one of the application and a timeline source for rendering the media timeline;

a noskip property that specifies that the rendering of the at least one said node is not to be skipped when the media timeline is rendered; and

a noskip child property that specifies that the at least one said node has another said node, which is a child of the at least one said node, which specifies that the rendering of the other said node is not to be skipped when the media timeline is rendered.

8. A method as described in claim 1, wherein at least one said node is configured to reference an effect to be applied to an output of media referenced by the node.

9. A method as described in claim 1, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

10. A method as described in claim 1, wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

11. A method as described in claim 1, wherein at least one said node is specified as read-only.

12. A method as described in claim 1, wherein at least one said node is configured for communication of events to another said node such that a change may be made to the media timeline while the media timeline is rendered.

13. A method as described in claim 1, wherein the first and second said media have different formats, one to another.

14. One or more computer readable media comprising computer executable instructions that, when executed by a computer, direct the computer to perform the method of claim 1.

15. A method comprising:
generating a media timeline by an application, wherein the media timeline:
includes a plurality of nodes; and
defines a presentation of a first said media referenced by a first said node

with respect to a second said media referenced by a second said node; and
passing the media timeline to a timeline source for rendering.

16. A method as described in claim 15, wherein the first and second said media have different formats, one to another.

17. A method as described in claim 15, wherein at least one said node is configured to reference an effect to be applied to an output of media referenced by the node.

18. A method as described in claim 15, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

19. A method as described in claim 15, wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

20. One or more computer readable media comprising computer executable instructions that, when executed by a computer, direct the computer to perform the method of claim 15.

21. A method comprising:

specifying an effect to be applied to one or more of a plurality of media when the media is rendered; and

generating a media timeline configured for exposure via an application programming interface (API), wherein:

the media timeline includes a plurality of nodes;

two or more said nodes reference respective said media; and

one or more said nodes that reference the one or more said media include metadata that describes the effect.

22. A method as described in claim 21, wherein the effect is a simple effect provided by a software component that is configured to:

receive a single stream of media;

apply the effect to the single stream; and

output the applied single stream.

23. A method as described in claim 21, wherein the effect is a composite effect provided by a software component that is configured to:

receive at least two streams of media;

apply the effect to the at least two streams; and

output a single stream of media composed of the applied at least two streams.

24. A method as described in claim 21, wherein the effect is a composite effect provided by a software component that is configured to at least one of analyze at

least two streams of media and output at least two streams of media.

25. A method as described in claim 21, wherein the effect is a transition effect to be applied as a transition from a first said media referenced by a first said node to a second said media referenced by a second said node.

26. A method as described in claim 21, wherein the effect includes metadata that describes the effect that is selected from the group consisting of:

- an effect object GUID property that specifies a GUID to be used to create a transform object that is configured to provide the effect;

- an effect object property that references an effect object that is configured to provide the effect;

- a priority property that specifies an ordering of a plurality of said effects, one to another;

- a start time property that specifies when processing of the effect is to begin with respect to rendering of the one or more said nodes;

- a stop time property that specifies when processing of the effect is to stop with respect to rendering of the one or more said nodes;

- a time format property that specifies a time format for at least one of the start time property and the stop time property

- a number of inputs property that specifies a number of inputs to the effect;

- a number of outputs property that specifies a number of outputs from the effect;

- an output major type property that specifies a major type for media, to which, the

effect is to be applied; and

an input connections property that specifies the one or more said nodes that are to be processed by the effect.

27. A method as described in claim 21, wherein at least one said node includes metadata that describes rendering of the at least one said node.

28. A method as described in claim 21, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

29. A method as described in claim 21, wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

30. A method as described in claim 21, wherein at least one said node is specified as read-only.

31. A method as described in claim 21, wherein at least one said node is configured for communication of events to another said node such that a change may be made to the media timeline while the media timeline is rendered.

32. One or more computer readable media comprising computer executable

instructions that, when executed by a computer, cause the computer to perform the method of claim 21.

33. In a media timeline exposed via an application programming interface and having a plurality of nodes, a method comprising:

rendering a first media item referenced by a first said node;

receiving a call for a second said node that references a second media item; and

creating the second said node.

34. A method as described in claim 33, further comprising rendering a second media item referenced by the second said node when the rendering of the first media item is completed.

35. A method as described in claim 33, further comprising:

rendering the second media item referenced by the second said node;

receiving a call for a third said node that references a third media item; and

creating the third said node.

36. A method as described in claim 33, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

37. A method as described in claim 33, wherein at least one said node is

configured to reference an effect to be applied to an output of media referenced by the node.

38. A method as described in claim 33, wherein at least one said node is specified as read-only.

39. A method as described in claim 33, wherein at least one said node is configured for communication of events to another said node such that a change may be made to the media timeline while the media timeline is rendered.

40. One or more computer readable media comprising computer executable instructions that, when executed by a computer, direct the computer to perform the method of claim 33.

41. In a media timeline exposed via an application programming interface, the media timeline having a plurality of nodes, at least two said nodes referencing respective media, one or more said nodes each having metadata that references a node grouping, a method comprising:

loading a first said node;

examining the first said node to determine a first said node grouping;

loading each said node referenced by the first said node grouping;

rendering the first said node grouping;

examining one or more said nodes in the first said node grouping to determine a

second said node grouping;

loading each said node referenced by the second said node grouping; and

when the rendering of the first said node grouping is completed, rendering the second said node grouping.

42. A method as described in claim 41, wherein the examining of the one or more said nodes in the first said node grouping is performed during the rendering of the first said node grouping.

43. A method as described in claim 41, wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

44. A method as described in claim 41, wherein at least one said node is configured to reference an effect to be applied to an output of media referenced by the node.

45. A method as described in claim 41, wherein at least one said node is specified as read-only.

46. A method as described in claim 41, wherein at least one said node is configured for communication of events to another said node such that a change may be made to the media timeline while the media timeline is rendered.

47. A method as described in claim 41, wherein a first said node references said media having a different format than said media referenced by a second said node.

48. One or more computer readable media comprising computer executable instructions that, when executed by a computer, direct the computer to perform the method of claim 41.

49. In a media timeline exposed via an application programming interface, the media timeline having a plurality of nodes, two or more said nodes each referencing respective media, a method comprising:

rendering a first said node to output a referenced first said media;

during the rendering, changing one or more properties of a second said node; and

initiating, by an event generator located on the second said node, an event for communication to a parent said node of the second said node, wherein the event describes the changing.

50. A method as described in claim 49, wherein the event is communicated to at least one of an application over the API and a timeline source for rendering the media timeline.

51. A method as described in claim 49, wherein the one or more properties are selected from the group consisting of:

node added event;
node removed event;
node changing event;
node changed event;
remove children event;
node source added event;
node source removed event;
node sort event; and
node moved event.

52. A method as described in claim 49, wherein:
one said node of the media timeline is configured as a root node; and
each said event generated by one of the plurality of nodes that is a child of the root node is communicated to the root node.

53. A method as described in claim 49, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

54. A method as described in claim 49, wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

55. A method as described in claim 49, wherein at least one said node is specified as read-only.

56. A method as described in claim 49, wherein at least one said node is configured to reference an effect to be applied to an output of said media referenced by the node.

57. One or more computer readable media comprising computer executable instructions that, when executed by a computer, direct the computer to perform the method of claim 49.

58. An application programming interface for exposing a media timeline to one or more independent applications, and comprising:

the media timeline including a plurality of nodes that are callable by one said application, wherein:

each said node includes metadata that describes the node;

one or more said nodes reference a corresponding media item;

the plurality of nodes are arranged in a tree structure; and

the arrangement of the plurality of nodes, one to another, describes an order for rendering the plurality of nodes.

59. An application programming interface as described in claim 58, wherein the metadata for each said node is selected from the group consisting of:

a URL property for the media referenced by the node;

a source object property that specifies a source object which can resolve to a media source that provides the media referenced by the node;

a source object ID property that specifies a unique identifier of the source object;

a start time property that specifies when rendering of the node is to begin with respect to another said node;

a stop time property that specifies when rendering of the node is to stop with respect to another said node;

a media start property that specifies a time, during a duration of the media referenced by at the node, that rendering of the media is to be started;

a media stop property that specifies a time, during a duration of the media referenced by the node, that rendering of the media is to be stopped;

a time format property that specifies a time format for at least one of the start time property, the stop time property, the media start property, and the media stop property;

a stream selection property which specifies one of a plurality of streams for rendering of the media referenced by the node;

a format based property that specifies a format for the media referenced by the node;

a loop count property that specifies a number of times the node is to be rendered;

a disabled property that specifies whether the node is to be rendered when the media timeline is rendered;

a noskip property that specifies that the rendering of the node is not to be skipped when the media timeline is rendered; and

a noskip child property that specifies that the node has another said node, which is a child of the node, which specifies that the rendering of the other said node is not to be skipped when the media timeline is rendered.

60. An application programming interface as described in claim 58, wherein at least one said node is configured to reference an effect to be applied to an output of media referenced by the node.

61. An application programming interface as described in claim 58, wherein at least one said node includes metadata that describes rendering of the at least one said node.

62. An application programming interface as described in claim 58, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

63. An application programming interface as described in claim 58, wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

64. An application programming interface as described in claim 58, wherein at least one said node is specified as read-only.

65. An application programming interface as described in claim 58, wherein at least one said node is configured for communication of events to another said node such that a change may be made to the media timeline while the media timeline is rendered.

66. An application programming interface for exposing a media timeline to one or more independent applications, and comprising the media timeline including a plurality of nodes that are callable by one said application, wherein:

two or more said nodes reference respective media;

the plurality of nodes are arranged in a hierarchy to include a parent said node and a child said node; and

the child said node is configured for initiating an event for communication to the parent said node.

67. An application programming interface as described in claim 66, wherein another said node, which is not a parent of the child said node, subscribes to the child said node to receive the event.

68. An application programming interface as described in claim 66, wherein another said node subscribes to the child said node to receive:

the event initiated by the child said node; and

one or more said events initiated by children of the child said node.

69. An application programming interface as described in claim 66, wherein the event:

is configured such that a change may be made to one or more properties of the child said node while the media timeline is rendered; and describes the change.

70. An application programming interface as described in claim 66, wherein the event describes a change made to the media timeline, the event selected from the group consisting of:

node added event;
node removed event;
node changing event;
node changed event;
remove children event;
node source added event;
node source removed event;
node sort event; and
node moved event.

71. An application programming interface as described in claim 66, wherein:
one said node of the media timeline is configured as a root node; and
each said event generated by one of the plurality of nodes that is a child of the root node is communicated to the root node.

72. An application programming interface as described in claim 66, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

73. An application programming interface as described in claim 66, wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

74. An application programming interface as described in claim 66, wherein at least one said node is configured to reference an effect to be applied to an output of media referenced by the node.

75. An application programming interface as described in claim 66, wherein at least one said node is specified as read-only.

76. An application programming interface for exposing a media timeline to one or more independent applications, and comprising the media timeline including a plurality of nodes that are callable by one said application, wherein one or more said nodes:

reference corresponding media;

include metadata describing one or more properties for rendering the

corresponding media; and

include metadata specifying the node as read-only.

77. A system comprising:

a plurality of media;

a plurality of applications; and

an infrastructure layer that:

provides an application programming interface (API) for interaction by the plurality of applications with the plurality of media when any said application is executed; and

exposes a media timeline, callable by the plurality of applications via the API upon an execution thereof, and that defines a presentation of the plurality of media.

78. A system as described in claim 77, wherein the media timeline is configured to reference an effect for application to an output of one or more of the plurality of media.

79. A system as described in claim 77, wherein:

the media timeline includes a plurality of nodes;

one or more said nodes references respective said media;

the media timeline defines a presentation of a first said media referenced by a first said node with respect to a second said media referenced by a second said node; and

at least one said node includes metadata that describes rendering of the at least one said node.

80. A system as described in claim 77, wherein:
the media timeline includes a plurality of nodes;
one or more said nodes references respective said media; and
the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

81. A system as described in claim 77, wherein:
the media timeline includes a plurality of nodes;
one or more said nodes references respective said media; and
wherein the media timeline is configured for dynamic creation such that at least one said node is created while the media timeline is rendered.

82. A system as described in claim 77, wherein:
the media timeline includes a plurality of nodes;
one or more said nodes references respective said media; and
at least one said node is specified as read-only.

83. A system as described in claim 77, wherein:
the media timeline includes a plurality of nodes;

one or more said nodes references respective said media; and

at least one said node is configured for communication of events to another said node such that a change may be made to the media timeline while the media timeline is rendered.

84. A computer comprising:

a processor; and

memory configured to maintain:

a plurality of media;

a plurality of applications, wherein each said application is configured to request at least one of editing, encoding, and rendering of the plurality of media; and

an infrastructure layer configured to:

provide an application programming interface (API) for interaction by the plurality of applications with the plurality of media; and

expose a media timeline, callable by the plurality of applications via the API, that includes a plurality of nodes that define a presentation of the plurality of media, wherein the media timeline specifies delayed creation of one or more said nodes when the media timeline is rendered.

85. A computer as described in claim 84, wherein the delayed creation further comprises creating the one or more said nodes when called by one or more said applications.

86. A computer as described in claim 84, wherein the media timeline is configured for dynamic loading such that metadata included in at least one said node specifies a collection of said nodes to be loaded when the media timeline is rendered.

87. A computer as described in claim 84, wherein at least one said node is configured to reference an effect to be applied to an output of media referenced by the node.

88. A computer as described in claim 84, wherein at least one said node of the media timeline is configured for communication of events to another said node such that a change may be made to the media timeline while the media timeline is rendered.